

**National Academies of Sciences, Engineering, and Medicine:
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2017 Risk-limiting Audit

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History

- Random post-election audits a requirement since 2005
- Risk-limiting audits adopted into law in 2009
 - Implementation delayed to give time for technology and processes to develop
 - Delayed again in 2013 because of adoption of Colorado's all mail ballot voting model
 - Beginning with 2017 coordinated election, all counties required to conduct RLAs

Comparison vs Ballot Polling Audits

- Two types of risk limiting audits
- Comparison audit:
 - RLA in which humans compare voter markings on randomly selected paper ballots to ballot-level cast vote records, or data showing how the voting system interpreted those markings on each individual ballot
 - Counties using the new voting system conduct comparison audits
- Ballot polling audit:
 - RLA for jurisdictions using legacy voting systems that do not export ballot-level CVRs
 - Human beings simply report the markings on randomly selected ballots until the risk limit is satisfied

2017 Coordinated Election RLA

- RLA representative group met February through April
- Began training and preparing in the spring
 - Two rounds of training
 - Round 1 - March and April
 - Conceptual, learned what the RLA is
 - Focused on importance of good processes
 - Round 2 – August and September
 - Showed the tool and trained to specific processes
 - Continued to emphasize importance of good processes
 - Mock RLA and hands-on practice a few days before election day
- Clerk's group worked on scanning and batching best practices

RLA Software Tool

- Contracted with Free & Fair to develop a tool to help make the audit as efficient as possible
- Development and testing July through November
- Code is open source: <https://github.com/FreeAndFair/ColoradoRLA>
 - We want other jurisdictions to be able to benefit from our experience
 - It's transparent – anyone can review the code
 - We want to benefit from anyone who reviews the code and has ideas on improvement

RLA Tool – State Page

The audit has not yet been defined.

Click to download intermediate audit report.

Download

County Updates

Filter by County Name:

Name	Status	Submitted	Audited Contest Discrepancies	Non-audited Contest Discrepancies	Disagreements	Remaining in Round [?]	Est. Remaining Ballots [?]
Adams	Not started	0	—	—	—	0	0
Alamosa	Not started	0	—	—	—	0	0

Contest Updates

Hand Count County Name Discrepancies

RLA Tool – County Page

☰ Colorado RLA

Hello, Alamosa County!

Please have the audit board sign in.

❗ Audit board is not signed in.

Click to download intermediate audit report.

Download

 Audit Board

 Start Audit

County Info

County:	Alamosa
Status:	Audit underway
Current Round:	1
Ballot cards remaining in round:	4
Ballot cards audited (all rounds):	0
Disagreements (all rounds):	0
Discrepancies (all rounds):	0

Contest Info

Presidential Electors

Name	Description
Hillary Clinton / Tim Kaine	DEM
Donald J. Trump / Michael R. Pence	REP
Darrell L. Castle / Scott N. Bradley	ACN
Gary Johnson / Bill Weld	LBR

Coordinated Election Timeline

- Establish the Risk Limits – deadline 32 days before Election Day
 - Met on October 5 and posted on October 6
 - Limit for comparison audit was 9%
 - Limit for ballot polling audit was 20%
- Select audited contests – deadline 3 days after Election Day
 - Met on November 8 and circulated contest to counties for comment
 - Posted on November 9
- County uploads – deadline 9 days after Election Day
- Select Random Seed and commence audit – deadline 10 days after Election day
- Counties conducted audits – 10-14 days after Election day

Outcome

- All 56 counties passed the audit
- 50 comparison audit counties using new voting systems
- 5 ballot polling audit counties using legacy voting systems
- 1 county on new voting system moved to ballot polling audit because of deadline issue

Comparison vs Ballot polling

- Comparison audit counties – 50 counties
 - 35 counties with no discrepancies
 - 8 counties with discrepancies in non-audited contests
 - 4 counties with a discrepancy in the audited and some discrepancies in non-audited contests
 - 3 counties with a single discrepancy in the audited contest, didn't require a second round
 - 3 counties with enough discrepancies in the audited contest to require a second round
- Ballot polling counties – 6 counties
 - 3 counties satisfied the risk limit in the first round
 - 3 counties conducted second round

Success!

- Not logistically overwhelming
- Process and training are key
 - Counties created some excellent processes
 - Strong correlation between attending all training and participating in mock RLA and whether experienced issues – in particular hands on
- Some process and training issues identified at county and state level

What's Next

- Conceptual issues to address
 - Currently no published literature on conducting an audit of the primary election
 - Colorado will conduct it's first open mail ballot primary in 2018
 - Candidates include federal, state, and local
 - Need to address random selection when there are multiple party ballots
 - Additional new voting system may be purchased
 - Need to ensure the CVR export will import into the RLA tool and properly parse
 - Need to determine whether any process changes are required

What's Next

- Enhancements to the RLA tool
 - UI changes
 - Review screen and pop-ups for critical actions for state users
 - Pop-up warnings for critical actions for county users
 - Additional instructional text for county users
 - More feedback to the user
 - Clearer instructions for concluding the audit
 - Functional updates
 - Ability for counties with large number of ballots to have multiple teams working simultaneously
 - Addition information in county reports and changes to reports for clarity
 - Ability to correct county status before launching audit
 - Better handling of statewide contest

What's Next

- Training
 - Debrief and discussions with the counties at the January conference and spring regional meetings
 - Refresher training and more hands-on practice
 - Training for counties moving to new voting systems for the 2018 elections
- Guides and best practices
 - Revise step-by-step user guide
 - Work with clerk's group to update best practices document based on lessons learned

What's Next

- Statute and rule changes
 - May need additional rules to address primary election
 - Proposing extension of statutory canvass deadline
 - Adopt rules or voting systems conditions of use requiring uniform ballot style and contest naming conventions
- Update contingency plans to reflect lessons learned
 - Temporary loss of power or internet – counties found some additional creative solutions
 - Technical issues that require having a second database on standby
 - Critical staffing changes at the state or a county

Conclusion

- Overall, an extremely successful first effort
- We expected to learn a lot, and we did
- Next year, we'll conduct our first RLAs of the primary and general elections
- We expect we'll continue to learn a lot through the next two elections, and we will share those lessons as we go